Remarks

Claims 1-6 are pending in this application. Claims 1 and 4-6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cloutier (U.S. Patent No. 6,668,165) in view of Issa et al. (U.S. Patent No. 6,317,034). Claims 2 and 3 stand objected to as being dependent upon a rejected base claim.

The invention relates generally to radio frequency (RF) receivers. More particularly, the invention relates to an improved super-regenerative receiver arrangement capable of receiving narrow-band signals.

Generally, a super-regenerative receiver operates using an oscillating signal detector having the oscillation interrupted, that is, quenched, at a relatively low frequency. Because the quenching operation and frequency force the detector response to be very broad, super-regenerative receivers suffer from the need to use tuned input circuits to allow them to be used with narrow-band signals.

Claim 1 recites a narrow bandwidth, super-regenerative receiver. The receiver comprises a signal detector, a quench circuit and a frequency sweeping circuit. The signal detector has a regenerative oscillator for detecting a signal transmitted at a particular transmit frequency. The quench circuit is connected to the regenerative oscillator for interrupting the oscillation of the oscillator at a predetermined frequency.

The frequency sweeping circuit is connected to the regenerative oscillator and the quench circuit. The quench circuit is arranged to cycle the regenerative oscillator and the frequency sweeping circuit on and off together. The frequency sweeping circuit controls operation of the regenerative oscillator to a desired narrow bandwidth around the transmit frequency.

Put another way, claim 1 recites a super-regenerative receiver composed of a signal detector having a regenerative oscillator and a quench circuit connected to the regenerative oscillator, wherein a frequency sweeping circuit is connected to the regenerative oscillator and the quench circuit to control operation of the regenerative oscillator to a desired narrow bandwidth around the transmit frequency.

That is, the addition of the frequency sweeping circuit to the regenerative oscillator and quench circuit is advantageous in that it results in the regenerative oscillator functioning as a center frequency movable (sweeping) band pass filter with a narrow band. As explained in the background art on page 1 of Applicant's specification, prior super-regenerative receivers suffer from the need to use tuned input circuits to allow the use with narrow band signals. Applicant's invention addresses this problem by providing an improved super-regenerative receiver including a frequency sweeping circuit among other elements as recited by Claim 1.

Cloutier describes an inverted super-regenerative receiver. More specifically, Cloutier describes an amplifier for high gain, narrow band signal amplification. The disclosed embodiment is an amplifier that is controlled to provide narrow band signal amplification. As best conveyed by Figure 10, positive feedback resonant circuit 100 (KT Cell) uses a feedback loop to hold the bias at a proper level for a match filter, and the gain is periodically increased to force oscillation. Col. 6, lines 7-10. As explained by Cloutier, "as a result of the fact that the Q is momentarily lowered when the oscillation starts, the Q buildup is relatively fast. Also, the oscillation phase starts with a relatively large signal present in the loop and hence the exponential buildup is much faster than if the start were from a point with no energy in the loop." Col. 6, lines 20-25.

Cloutier does describe an amplifier for high gain, narrow band signal amplification. To achieve this end, Cloutier, as exemplified in Figure 10, uses a feedback loop and Q control approach. As clearly shown in Figure 10, a raw Q control and a Q control

signal are compared at 115, and connect through Q charge pump 116 and Q loop filter 118 to multiplier 122.

In contrast to Cloutier, the invention uses a far different approach to implementing a narrow bandwidth, super-regenerative receiver. As recited by Claim 1, the claimed super-regenerative receiver includes, among other limitations, a regenerative oscillator connected to a quench circuit in combination with a frequency sweeping circuit. Cloutier fails to describe or suggest the claimed frequency sweeping circuit and its relationship among the other elements to achieve the claimed invention, but instead only describes a Q control approach utilizing feedback to control Q and operate between operation and close to oscillation.

The Examiner relies on Issa as suggesting the modification of Cloutier to incorporate interrupting the oscillation of the oscillator at a predetermined frequency and to achieve the claimed invention. As explained above, Cloutier uses a far different approach than recited by Claim 1 and has fundamental deficiencies. Issa does not address the deficiencies of Cloutier, and Cloutier in combination with Issa fails to suggest the claimed invention. There is no more motivation to combine Cloutier and Issa to achieve the claimed invention.